

REMARKS

Claims 24-47 are active in the case. Reconsideration is respectfully requested.

The present invention relates to a polymer for matte injection molded articles.

Claim Amendments

Claims 24 and 27-30 have been amended in order clearly recite the closed scope of materials that constitute the polymer matrix of the present claims. The conventional language used in the transitional phrase of each claim is consistent with the wording of the original claims as to the polymer matrix. Entry of the amended claims is respectfully requested.

Invention

The objective of the present invention is to provide a thermoplastically processable polymer mixture for use in the injection molding of parts which have a matt surface and at the same time have a very good ability to resist mechanical and/or chemical/physical effects. The polymer mixture is comprised of three basic components which are:

(I): a matrix phase consisting essentially of:

- (i) a (meth)acrylate (co)polymer having a Vicat softening point (ISO 306-B50) of at least 104° C, **or**
- (ii) a mixture of (meth)acrylate (co)polymers with a Vicat softening point (ISO 306-B50) of at least 104° C, **or**
- (iii) a (meth)acrylimide (co)polymer; **or**
- (iv) mixtures of a (meth)acrylimide (co)polymer (iii) with (co)polymer (i) or (ii);

(II): an impact modifier which is based on cross-linked poly(meth)acrylate and which does not bond to the polymer mixture by established covalent bonds; and

(III): from 1 to 15 % by weight of plastics particles composed of crosslinked polymers based on polymethyl methacrylate, on polystyrene and/or on polysilicones, each having a median particle size in the range from 1 to 30  $\mu\text{m}$ . The three components (I), (II) and (III) constitute 100 % by weight of the composition. The polymer composition may further comprise conventional additives, auxiliaries and/or fillers.

Prior Art Rejection

Claims 24-37, 39, 42-46 stand rejected based on 35 USC 103(a) as obvious over Kress et al, U. S. Patent 4,895,898 in view of Suettlerlin, U. S. Patent 5,621,028 and Lichtenstein et al, U. S. Patent 5,621,028. This ground of rejection is respectfully traversed.

Applicants maintain their previously stated position that the primary reference, Kress et al discloses a polymer composition that is completely different from that which is presently claimed. As described by the patent, the composition disclosed is formed from four components identified as (A), (B), (C) and (D) (col 6, lines 44-54).

As to component (A) of the patent, column 1 specifies that component (A) is present in an amount ranging from 20-80 parts by weight and is a thermoplastic polycarbonate, based on 100 parts by weight of the (A), (B) and (C) polymer components of the mixture. It is the primary polymer component of the polymer mixture of the patent. On the other hand, the polymer matrix does **not** contain a thermoplastic polycarbonate as a component.

As to component (B) of the patent, the same constitutes from 10-60 parts by weight of the polymer mixture and is a rubbery material that is formed by graft polymerizing a mixture of one or more ethylenically unsaturated monomers identified as (B1.1) and one or more ethylenically unsaturated monomers identified as (B1.2) (Each of the mixed monomer materials include methyl methacrylate as a possible monomer.) onto a rubber such as a

material that is disclosed in the paragraph bridging columns 4 and 5 of the patent. On the other hand, no such rubbery material is a component of the polymer matrix of the present composition. Given that component (B) of the patent is a rubbery material, it would seem that component (B) would function as an impact modifier. However, there does not appear to be mention of the component as having this function in the patent.

As to polymer component (C) of the patent, the same constitutes from 10-70 parts by weight of the composition and has an intrinsic viscosity of 20 to 110 ml/g. The polymer is formed by copolymerizing a mixture of one or more ethylenically unsaturated monomers identified as (C.1) that are selected from the group of styrene,  $\alpha$ -methylstyrene, nuclear substituted styrene, methyl methacrylate or mixtures thereof and one or more ethylenically unsaturated monomers identified as (C.2) that are selected from the group of (meth)acrylonitrile, methyl methacrylate, maleic anhydride, N-substituted maleimide or mixtures thereof. It is particularly noteworthy that no methyl methacrylate (co)polymer is exemplified as a component (C), but rather a styrene/acrylonitrile copolymer. From this description of the polymer mixture of the patent it is clear that the mixture of three distinct polymer materials of the reference ((A), (B) and (C)) does not at all suggest any of the four polymer matrix materials (i), (ii), (iii) and (iv) of the present invention.

The patent discloses a fourth copolymer component (D) which is employed in an amount ranging from 0.5 to 7.5 parts by weight relative to 100 parts by weight of the total of (A), (B) and (C). This copolymer is prepared by (co)polymerizing 0-90 % by weight of one or more ethylenically unsaturated monomers identified as (D.1) and one or more ethylenically unsaturated monomers identified as (D.2) (Each of the mixed monomer materials include methyl methacrylate as a possible monomer.) The copolymer (D) component is an adjunct to the primary mixture of components (A), (B) and (C). Further, there is no disclosure in the patent of a specific additive of plastic beads that are comprised of

crosslinked polymers based on polymethyl methacrylate, on polystyrene and/or on polysilicones.

The Examiner contends with respect to Kress et al that polymer matrix "a" of Claim 24 reads on components (B), (C) and (D). Applicants contend to the contrary that such is not the case. First note that polymer matrix materials (iii) and (iv) must at least comprise (co)poly(meth)acrylimide or mixtures of (co)poly(meth)acrylimide with components (i) or (ii). On the other hand, no (meth)acrylimide based polymers are taught by Kress et al! As to components (i) and (ii), applicants point out that component (B) of the reference is directed to a graft copolymer in which methyl methacrylate is a possible monomer for grafting onto a rubber base. Such a graft polymer is **not** within the scope of components of the present claims. With respect to component (C) of Kress et al, it is granted that methyl methacrylate is disclosed as a possible monomer in both of (C.1) and (C.2). However, no such product polymethacrylate is shown or suggested in Kress et al. Further, there is no disclosure of a (meth)acrylate polymer that has a Vicat softening point of at least 104° C, and certainly no disclosure of poly(meth)acrylate mixtures that have a Vicat softening point of at least 104° C. A very similar thing can be said of copolymer component (D). Accordingly, Kress et al does not suggest the invention as claimed.

The Examiner cites the Suettlerlin et al patent for its disclosure of an impact modifier that has a core/shell structure of a core of a hard, non-elastomeric material, followed by a first surrounding elastomeric layer or intermediate stage and then a second surrounding non-elastomeric layer or final stage. However, there is no motivation provided by either of the two patents to add the impact modifier of the Suettlerlin et al patent to the composition disclosed in Kress et al. Not only that, but if in fact component (B) of the polymer mixture of Kress et al functions as an impact modifier, then why would one of skill add another impact modifier to the composition? On the other hand, if one of skill is said to substitute the impact

modifier of Suettlerlin et al for component (B) of Kress et al, where is the motivation provided by either reference to make such a substitution? Accordingly, applicants submit that the two cited references provide no motivation to combine the teachings of the references, and even if a substitution or addition of impact modifier were to be made, one would still not arrive at the present invention.

The Lichtenstein et al patent has been cited for its disclosure of plastic particles to a polymer matrix comprised of at least 80 % of units of methyl methacrylate. In particular, the patent discloses particles of crosslinked polystyrene as preferred. However, because of the substantial differences between the relatively simple homo- or co-polymer of methyl methacrylate disclosed in the patent, it is clear that even if one of skill was led to combine the teachings of Kress et al with Lichtenstein et al, one would not arrive at the present composition as claimed. Accordingly, the combined references fail to suggest the polymer composition as claimed in Claim 24. Moreover, since the other dependent claims grouped with Claim 14 all depend upon the base polymer composition as described in Claim 24, these claims are also distinguished over the cited references. Withdrawal of the outstanding ground of rejection is respectfully requested.

Claims 38, 40 and 41 are directed to minor secondary aspects of the invention upon which patentability does not depend. Moreover, these claims are either directly dependent on Claim 24 or are indirectly dependent on the claim, and therefore incorporate all of the limitations of the generic claim therein. Thus, these dependent claims stand patentable over the cited combinations of references used to reject them. Withdrawal of the outstanding ground of rejection is respectfully requested.

Claims 24, 26 and 47 stand rejected based on 35 USC 103(a) as obvious over Rhein et al, EP 0 691 351 in view of Suettlerlin, U. S. Patent 5,621,028 and Lichtenstein et al, U. S. Patent 5,621,028. This ground of rejection is respectfully traversed.

The Rhein et al disclosure is a very limited abstract which describes the preparation of a thermoplastic molding material by mixing the components of a major quantity of methyl methacrylate, an alkyl acrylate, a mercaptan and a radical initiator and less than 5 parts by wt of other non-polymerizable components and then conducting copolymerization. The polymer material is simply said as having a “higher” (than what?) Vicat softening point. Clearly, the Rhein et al reference does not suggest one of the four types of polymer materials identified in the present claims as (i), (ii), (iii) and (iv), since there is no teaching or suggestion of a (meth)acrylate (co)polymer or a blend of (meth)acrylate (co)polymers that have a Vicat softening point of at least 104° C, a (meth)acrylamide (co)polymer or a mixture of a (meth)acrylamide (co)polymer with a (meth)acrylate (co)polymer or a blend of (meth)acrylate (co)polymers that have a Vicat softening point of at least 104° C.

Neither the Suettlerlin nor the Lichtenstein et al patents overcomes the deficiencies of Rhein et al and withdrawal of the outstanding ground of rejection is respectfully requested.

Claims 24-37, 39, 42-46 stand rejected based on 35 USC 103(a) as obvious over Liebler et al, U. S. Patent 4,680,359 in view of Suettlerlin, U. S. Patent 5,621,028 and Lichtenstein et al, U. S. Patent 5,621,028. This ground of rejection is respectfully traversed.

The Liebler et al patent discloses a (meth)acrylate (co)polymer material that is formed by the copolymerization of the three monomer types identified as (A), (B) and (C). The (meth)acrylate copolymers are said to have a Vicat softening temperature of above 90° C. In order to prepare a product from a copolymer type taught by the reference, the copolymer is simply subjected to a molding operation such as extrusion molding, compression molding or injection molding. The closest the copolymer of the reference approaches the present invention is the polymer matrix of (meth)acrylate copolymer (i) which has a Vicat softening temperature of at least 104° C. A number of examples of (meth)acrylate polymers are shown in the table in columns 5 and 6, but these polymers are disclosed alone for molding into

objects of the desired shape. The patent does not disclose or suggest a moldable (meth)acrylate composition that contains a particulate plastic material and an impact modifier component. The patent does not speak to the necessity of these materials which would lead to moldable materials outside the scope of the present invention. It is therefore submitted that one of skill in the art would not be led to combine the patent with the secondary art that has been cited of Suettelin and Lichtenstein et al. Withdrawal of the outstanding ground of rejection is respectfully requested.

It is now believed that the application is in proper condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully submitted,

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